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The performance of a methamphetamine rehabilitation programme at De Novo rehabilitation centre. A descriptive study

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Declaration

I, Dr Moses Witbooi the undersigned, hereby declare that the work contained in this research assignment is my original work and that I have not previously submitted it, in its entirety or in part, at any university for a degree. I also declare that ethics approval for the study was obtained from the Health Research Ethics Committee (HREC) of Stellenbosch University and the Western Cape Department of Social development research ethics committee.

Signed:

Date: 24 January 2014

ABSTRACT

Background

Methamphetamine abuse "TIK" is highly prevalent in South Africa with Cape Town recording the highest incidence. This is associated with significant health, social and economic problems in South Africa. The aim of the continually growing number of rehabilitation centres in South Africa has been to provide treatment and support for substance abusers towards abstention from substance abuse. This study looked at the performance outcome of the rehabilitation programme at the largest state funded treatment centre, De Novo, in Cape Town.

Aim

This study examines the performance of the rehabilitation programme for amphetamine abuse at De Novo treatment centre in Cape Town over a period of one year.

Methods

Design and setting: A quantitative, descriptive cross-sectional survey was done. The setting was De Novo treatment centre situated in Kraaifontein, Cape Town. Data was collected from 91 client folder records out of a total population of 375 who received 7 weeks in-patient treatment and varying periods of aftercare over a period of one year

Measuring tools: Patient self-reporting was used in this study to assess abstinence from amphetamine use.

Results

The time period of aftercare after discharge from in-patient treatment was inadequate i.e. less than 6 months. Final aftercare assessments were done too early i.e. at a mean of 3.8 months after discharge for an accurate assessment of treatment outcome to be made. This early aftercare assessment gave De Novo treatment centre a good initial performance outcome. A total of 73.6% of clients self- reported abstinence but they were assessed only at a median time of 2 months after discharge. These clients who abstained were interviewed early at a median of 2 months while those who relapsed were interviewed at a median of 5 months. The amphetamine rehabilitation performance outcome cannot be accurately determined beyond 2 months for abstainers and 5 months for those who relapsed. However Mann Whitney U analyses showed that the rate of relapse increased with time after discharge from in-patient treatment. Treatment admissions showed a predominance of male (69.2%) unemployed clients(79.1%). The outcome of rehabilitation was not affected by patient age, gender, employment status, educational level, type of referral and co-using any other substances except alcohol. Alcohol and prolonged amphetamine abuse are associated with increased relapse rates. Prolonged amphetamine use i.e. ≥7.5 years was associated with increased relapse rates.

Conclusion:

This study found that the provision of adequate rehabilitation from amphetamine abuse at De Novo is a major challenge due to the occurrence of early relapse and inadequate after care. Patients relapsed as early as two months after discharge from in-patient treatment. The co-abuse of alcohol and amphetamine as well as prolonged use of amphetamine for ≥7.5 years impacted negatively on the successful outcome of rehabilitation. This latter group of patients may require special attention during in-patient treatment and aftercare. The substance abuse programme at De Novo may benefit from the input of lessons learned from similar programmes elsewhere in South Africa and internationally. In particular, patients need to be followed up for at least 6 months after discharge from treatment. The median two month period of aftercare follow up of patients at De Novo was inadequate.

There are no conflicts of interest.

LITERATURE REVIEW

The focus of this research is Methamphetamine abuse. The researcher is particularly interested in this area of research because of clinical exposure to so many methamphetamine abusers and their consequent stressed parents. Rehabilitation of amphetamine abusers has appeared to be poorly successful. The reasons for the presumably poor success rate are speculative at this point in time since not enough well controlled studies have been conducted both internationally as well as locally. It is not widely known how rehabilitation centres in South Africa approach the problem and how successful they are with their rehabilitation programmes. The researcher initially planned to study the causes of presumed poorly successful rehabilitation but such a study needed prior baseline studies to confirm success or failure of rehabilitation programmes. There exists unfortunately insufficient information available from studies about the success rates of rehabilitation programs in South Africa and Cape Town. For this reason it was decided to settle for just doing a study to determine the actual success of rehabilitation centres in particular De Novo treatment centre.

As amphetamine abuse increased in South Africa it brought about its related health, social and economic problems. Health facilities experienced an increase in amphetamine related mental health and physical illness. Community health as well as psychiatric hospitals has struggled to cope with the influx of patients with amphetamine related disorders [1,2]. With the shortage of hospital beds and the South African government policy shift towards integration and treatment of patients with mental health disorders into the community as well as the long wait for appointments at rehabilitation centres, it became necessary to focus on the development of effective rehabilitation facilities [3]. This research examines the effectiveness of one such rehabilitation facility. In

order to appreciate the difficulties faced by rehabilitation facilities it is worth stating the magnitude of the problem in terms of prevalence of amphetamine abuse, its health and social consequences.

Prevalence of amphetamine use

There has been a marked increase in the abuse of amphetamine worldwide and in South Africa in particular with the Western Cape reporting the biggest South African proportion of this increase [4,5,6,7].

In the second half of 2011 the number of patients treated for drug abuse in various provinces in South Africa were as follows: Western Cape (2733), Eastern Cape (721), Gauteng (2786), KZN (610), Mpumalanga/Limpopo(892), Free State/Northern Cape/North West (549) [8].

During the same period the patients treated for methamphetamine abuse as a proportion of total drug abuse treatment were as follows: Western Cape (52.1%), Eastern Cape (22.7%), Gauteng (3.9%), KZN (0.9%), Mpumalanga/Limpopo (3.5%), Free State/Northern Cape/North West (3.8%) [8,9].

Until 2003 most drugs abused in South Africa consisted of cannabis and alcohol while methamphetamine was used on a small scale [1,10,11]. However post 2003 the abuse of methamphetamine in South Africa - more specifically Cape Town - showed such a dramatic rise that it eclipsed the abuse of other drugs like cannabis and alcohol amongst the youth [8,9,12,13].

A 2012 SACENDU (South African Community Epidemiology Network on Drug Use) report revealed an increase in adult methamphetamine drug abuse in Cape Town during the period 2006 to 2011 [8].

Usage and Associated illnesses

Chronic methamphetamine use is associated with permanent cognitive impairment [14,15]. Following cessation of methamphetamine use, the withdrawal symptoms of depression, anxiety and fatigue can persist for up to 12 months [16,17,18,19,20]. These justifies the importance of long term treatment and follow up of patients after discharge from inpatient or short term outpatient rehabilitation [21,22]. For this reason monitoring of patients after discharge from treatment has to be done over an extended period of time i.e. from 6 months up to 18 months [19,20,21,23,24]. Cessation of monitoring prior to 6 months may not provide a true reflection of the success of the rehabilitation.

The social scientific value of this research

Rehabilitation of patients from substance abuse has been a major challenge and amphetamine abuse in particular has been a challenge because of the severe medical, social and economic adverse consequences it has had on South African society [13,25,26,27]. It appears ineffective since so many victims of methamphetamine abuse either choose not to go for rehabilitation or return to methamphetamine abuse not long after completing their

rehabilitation programmes [13,22]. The highly addictive properties of methamphetamine coupled with its rising scale of use resulted in increased demands put on already strained mental health services [16,17,28] .Drug counselling and treatment centres have struggled to cope with the volume of methamphetamine abusing patients and ensuring the institution of effective methamphetamine rehabilitation programmes [29]. Research on the effectiveness of these rehabilitation programmes is wanting on both international and national level. If methamphetamine abuse has such a vastly negative impact on South African society, one wonders how serious South African society sees this problem, how it attempts to deal with this problem and how successful these attempts have been.

In order to deal with the problem, Rehabilitation centres- in addition to already existing health facilities- have been established all over South Africa. One such rehabilitation centre is De Novo, in Cape Town. It is not widely known how these centres approach the problem and how successful they are with their rehabilitation programmes. It thus became necessary and beneficial to South African society to do a study of the problem and how successful they are at De Novo. De Nova is the largest rehabilitation centre in Cape Town and is 100% state funded. A study of De Novo may be used as a window through which other rehabilitation centres in South Africa can be looked at, hence the present research at De Novo.

Previous studies on success of amphetamine rehabilitation

There is no clinical evidence of efficacious pharmacotherapy in the treatment of patients with amphetamine abuse [6,22,30,31,32]. However, there is clinical evidence that psychotherapy is efficacious in the treatment of patients with amphetamine abuse [21,33,34,35,36]. Three psychosocial interventions have been shown to be of significant benefit i.e. brief motivational interviewing, cognitive behaviour therapy and contingency management [31,37,38]. Of the three, cognitive behaviour therapy has been considered as best practice [31,37,38]. The Matrix model is an outpatient treatment plan which uses amongst others, cognitive behaviour therapy [38,39].

Amphetamine treatment studies in South Africa are limited. However a number of amphetamine treatment studies have been done in Europe and America [37]. These studies are limited in quantity and quality [37]. Current evidence indicates that there is no single psychosocial intervention which is able to address the entire complex issues involved [22,34,40]. This same evidence also “reports little significant behavioural changes with reductions in rates of drug consumption following an intervention” [40]. It refers in particular to the successfulness of patients to remain rehabilitated for months to years following discharge from rehabilitation programmes. However, individual studies had shown some results [41].

The studies found that both brief motivational interviewing and cognitive behaviour therapy have proven to significantly reduce the use of methamphetamine amongst patients.

In another randomised controlled study - the largest of its kind- by The Centre for Substance Abuse Treatment (CSAT) Methamphetamine Treatment Project (MTP) in the United States 2003 , the Matrix model was compared with TAU (treatment as usual) [23]. In this study the Matrix model showed better in- patient results than TAU. However, after discharge the Matrix Model did not show better success than TAU [23]. This is in keeping with the above Cochrane review [40]. A review done in 2008 found that cognitive behaviour therapy increases amphetamine abstinence rates after discharge from in-patient treatment while contingency management proved only effective during in-patient treatment [6]. Again this is in keeping with the above Cochrane review [40].

In South Africa experts in the field agree that treatment outcomes have been poor and a “dismal failure” [25]. An MRC Medical Research Council (MRC) scientist labeled prevention strategies in South Africa as “ineffective and misdirected” [25].

Tools to measure abstinence from amphetamine use

Abstinence from amphetamine use is highly important in methamphetamine rehabilitation [21,37,42]. Methamphetamine’s short half-life reduces the reliability of urine sample testing for amphetamine because the drug is eliminated from the body within less than a week. Thus, using such a test to monitor amphetamine use can only be useful if it is done at least once every week. Even then, the urine tests have been described as not highly sensitive and specific for amphetamine and in addition may even give false positive results [16]. “A true-positive result in a sick client does not necessarily indicate that the presenting illness is due to methamphetamine toxicity [16]”. “The lack of correlation between serum or urine concentrations and clinical effects means such tests are of limited value in acute management of the patient and should not be considered a routine component of assessment procedures [16]”.

Some studies used the urine amphetamine test to confirm abstinence [21,22,37]. The test would be done once per week during in-patient treatment and as spot tests at 6 and 12 month intervals. This is where the reliability of the urine test is brought into question because the test result only reveals amphetamine use within one week after stopping drug usage. Abstinence during in-patient treatment was defined as three consecutive methamphetamine- free urine tests [21,22,37]. However, the greatest difficulty in maintaining abstinence will be after discharge from in-patient treatment. A negative spot urine drug test done at 6 or 12 months will not provide information of amphetamine use during the periods day 1 after discharge and two weeks prior to the negative urine test. In an attempt to improve study instrument validity, many studies used a combination of the amphetamine urine test and psychometric methods to confirm abstinence from amphetamine use. Psychometric methods consists of standardised structured questionnaires in which a counselor and/or patient completes and includes patients self-reports of abstinence. These questionnaires include questions from various angles which allow the patient to be given a score. These scores are quantified, valuated, categorized and labeled and used to get an overall assessment of patient outcome. A well done systematic review to identify psychometric assessment

tools identified 595 available tools of which only the following 6 tools qualified as having “merit” and as suitable for use in practice:

Addiction severity index (ASI), Chemical Use, Abuse and Dependence Scale (CAUD), Form 90, Maudsley Addiction Profile (MAP), Measurements in the Addictions for Triage and Evaluation (MATE) and Substance Abuse Outcomes Module (SAOM) [24].This review concluded that ASI and CAUD are the two instruments best suited for routine clinical use [24]

Reliability and Validity of Patient self-reported abstinence

Patient self-reported abstinence has been widely used and accepted internationally as a screening tool for substance use [43,44]. Various studies of test validity have found good concordance – 80% to 88%- between patient self-reported abstinence and toxicology tests [21,22,37,44,45]. Patients who self-reported abstinence were also found to have negative urine test results [22]. In some studies patients self-reported higher drug use than what was found with the urinalyses tests [22,44]. Doing research to compare self-reported abstinence and urine drug tests tend to have the confounding variable that the one test exerts on the other when it is done on the same population. Yet, performing a valid comparison of these two tests can only be done when the same population is used. An important influencing factor on test reliability and validity is the conditions under which the interviews take place e.g. whether interviews are conducted in a private, unbiased, non-judgmental way and patient confidentiality is protected. A confounding variable might have been the influence of being referred by the criminal justice system on patient co-operation with treatment and truthfulness when interviewed after discharge. However, studies using patient-self reporting found that patients referred by the criminal justice system had similar treatment outcomes to those who took voluntary treatment [21].

AIM

The aim of the research is to describe the success rate of the rehabilitation program for users and abusers of amphetamine at De Novo, Cape Town.

OBJECTIVES

The objectives of the study included:

1. To determine the number of patients who continue to self- report abstinence from amphetamine use up to 12 months after discharge from rehabilitation
2. To determine any associations between successful rehabilitation and gender, employment status, voluntary as well as court referrals
3. To describe the profile of illicit drugs used by patients admitted to De Novo
4. To record the current capacity and staff qualifications at De Novo to manage amphetamine abusers
5. To describe the rehab methods used for amphetamine abusing patients at De Novo
6. To describe the assessment methods used for amphetamine abusing patients at De Novo

METHODS

Design:

A quantitative retrospective study by using patient records was done.

Setting

The study was done at De Novo Treatment centre, situated on Old Paarl Road in Kraaifontein. It is a very popular, well known treatment centre with a long history and good rapport with the communities around Cape Town. The centre is state-owned and under the management of Department of Social Development, Western Cape. It can accommodate about 100 adult in-patients at one time. The centre provides assistance for patients with substance abuse or use problems. These substances include alcohol, cannabis, cocaine, heroin and methamphetamine "Tik". Currently only in-patient treatment is provided. All in-patients are expected to adhere to a 7 week structured programme of treatment. Voluntary indigent as well as patients referred by the criminal justice system are accepted for treatment. Approximately 540 patients are seen at the centre per year. It has about 92-95% occupancy at any time. During the period 2009 and 2010 a pilot post-treatment follow up program has been implemented through which aftercare reports were kept of patient progress after discharge from treatment. As this pilot project was temporary and required additional funding the plan was for the aftercare pilot project to be terminated at some stage. The manager of the centre is Ms. C Fledermaus. De Novo's reception can be contacted at Tel: 0219881108. The Postal address is Private Bag X1, Kraaifontein, 7569.

Sampling

The management of De Novo used its own client records to count the total number of patients admitted over the period 1 January 2009 till 31 December 2009.

General method of investigation

A sample of folder records of patients admitted to De Novo during the period 1 January 2009 till 31 December 2009 was assessed. Patients' personal identifiable information e.g. name and address were not required. In circumstances where personally identifiable information accidentally appeared in copies of patient folders, such information was not captured in any data collection tools. The collected data was analysed with the assistance of the Centre for Statistical Consultation (University of Stellenbosch).

Ethical approval was applied for and granted by both the University of Stellenbosch research ethics committee and the Western Cape Department of Social development research ethics committee. The application for ethical approval to the Department of Social development Western Cape research ethics committee included an additional PAIA [46] application form. The PAIA application proved to be a challenge. The Department of Social development Western Cape research ethics committee needed to consult its legal representatives prior to granting access to information recorded in patients' folders while the researcher had to consult the South African Human Rights Commission (SAHRC) [46]. In order to understand PAIA applications, the researcher needed to study the entire PAIA act. The fact that the Department of Family Medicine (University of Stellenbosch) had no prior comparable ethics application made this the first ethics application of its kind. This added to the waiting time to get PAIA approval.

No pilot study was done because the PAIA application became an obstacle in the way of doing a timeous pilot study prior to doing the main research because a pilot study would have needed its own PAIA application.

Inclusion Criteria

1) All adult inpatients irrespective of gender who was admitted and treated for amphetamine abuse at De Novo treatment centre over the period 1 January 2009 till 31 December 2009
2) Court referrals
    - A rehab court referral refers to patients who reported to a social worker for misdemeanours e.g. family disruption but who coincidentally admitted to abusing substances.
    - Criminal court referrals are patients who were accused of committing crimes and coincidentally admitted to abusing substances.

Exclusion Criteria

1. All patients aged younger than eighteen years
2. All patients who either did not use methamphetamines as a single drug or in combination with other illicit drugs
3. Patients who did not complete the inpatient treatment program

Data collection

The following information was extracted as variables from the case folders by using an Ms Excel spread sheet: Gender, employed, type of referral (rehab court vs. criminal court vs. voluntary), date of interview after discharge from in-patient treatment, patient self-report of abstention from substance use, relapse date, type of substances used, number of years of amphetamine use, type of treatment given, duration of treatment and type of follow up treatment.

Data analyses

The data was analysed by using STATISTICA version 9 [47].

The primary objective of the study, as stated previously, was to estimate the overall success rate within the population of interest. In order to estimate this success rate in the population the proportion of abstainers were calculated as well as 95% confidence intervals in order to express the uncertainty in the sample estimate of the population proportion. In order to examine possible differences or relationships between the success rate and the above-mentioned group's chi-squared tests of association were performed. The following general analysis rules were applied for all other analyses: Summary statistics were used to describe the variables. Distributions of variables were presented with histograms and/or frequency tables. Medians or means were used as the measures of central location for ordinal and continuous responses and standard deviations and quartiles as indicators of spread.

Relationships between two continuous variables were analysed with Chi-square tests and the strength of the relationships were measured with the Pearson, M-L, Yates and McNemar correlation, if the continuous variables were not normally distributed. The relationships between continuous response variables and nominal input variables were analysed using appropriate analysis of variance (ANOVA). When ordinal response variables were compared versus a nominal input variable, a non-parametric ANOVA method was used. For this completely randomized design the Mann-Whitney U test was used.

The relation between two nominal variables was investigated with contingency tables and likelihood ratio chi-square tests. A p-value of $p < 0.05$ represented statistical significance in hypothesis testing and 95% confidence intervals were used to describe the estimation of unknown parameters.

RESULTS

Table 1 shows the different members of staff, numbers and qualifications available at De Novo centre.

Table 1

	No.	Qualifications	Job description
Social workers	7	registration with professional body	case managers and performed group therapy sessions
Occupational therapists	2	Registration with HPCSA	managed creativity activities, life skills and stress management
Occupational therapy assistant	1	Registration with HPCSA	Assisted with managing creativity activities, life skills and stress management
Professional nurse	4	Grade 2 specialty in psychiatry. Registration with HPCSA	Evaluation , counseling and clinical problems
Enrolled nursing assistant	2	Registration with HPCSA	Assisted the professional nurses
Care staff	30	School grades 10 to 12. Experience and interest in community work	assisted with 24 hour supervision of in-patients as well social skills sessions like library skills, gardening, etc.
Aftercare interns	22	School grade 12, interest and experience with community work	conducted aftercare reporting throughout the Western Cape for a period of 2 years.
Religious groups	varied		Offered variety of religious programmes
Volunteer workers	varied		assisted with life skill sessions

Sampling

Of the original sample of 557 patients only 375 was recorded as having met the sampling criteria.

Each of the 375 patient folders was indexed by De Novo after which only the indexed list was forwarded to the researcher. This was in line with PAIA [46]. An adequate sample size was calculated to be 20.92% with at least a 95% confidence interval. The researcher selected a sample of 91 cases i.e. 24% in case some folder records contained incomplete information. A random number generator tool [48] was used to create a simple non-duplicating table of random numbers between 1 and 375. Staff at De Novo made copies only of relevant pages of the random list of 91 indexed folders. This was done to reduce the cost of making photocopies of entire folders. The copy process involved removing the personally identifiable information.

Characteristics of the sample population

These were characterized as follows (see table 1): mean age in years was 24.6 (95% CI: 23.5- 25.8, SD 5.6), female (30.8%) male (69.2%), employed (19.8%), unemployed (79.1%) missing employment status (1.1%), voluntary (44.0%) rehab court (7.7%) criminal court (48.3%).

Table 1

Characteristics of the sample population N=91

Category	***Count N=91***	***%***
Female	28	30.8
Male	63	69.2
Unemployed	72	79.1
Employed	18	19.8
Missing employment status	1	1.1
Voluntary	40	44.0
Criminal Court	44	48.3
Rehab court	7	7.7

Co-abused substances occurred as follows (see table 2): cannabis (53.8%) mandrax (35.2%) alcohol (18.7%) cocaine (4.4%) heroin (3.3%) other (4.4%).

Table 2

Co-abused substances

Co-Abused Substance	***Usage Yes/No***	***Count***	***%***
Cannabis	No	41	45.1
	Yes	49	53.8
	Missing	1	1.1
Alcohol	No	61	67.0
	Yes	17	18.7
	Missing	13	14.3
Mandrax	No	58	63.7
	Yes	32	35.2
	Missing	1	1.1
Heroin	No	85	93.4

	Yes	3	3.3
	Missing	3	3.3
Cocaine	No	85	93.4
	Yes	4	4.4
	Missing	2	2.2
Other	No	85	93.4
	Yes	4	4.4
	Missing	2	2.2

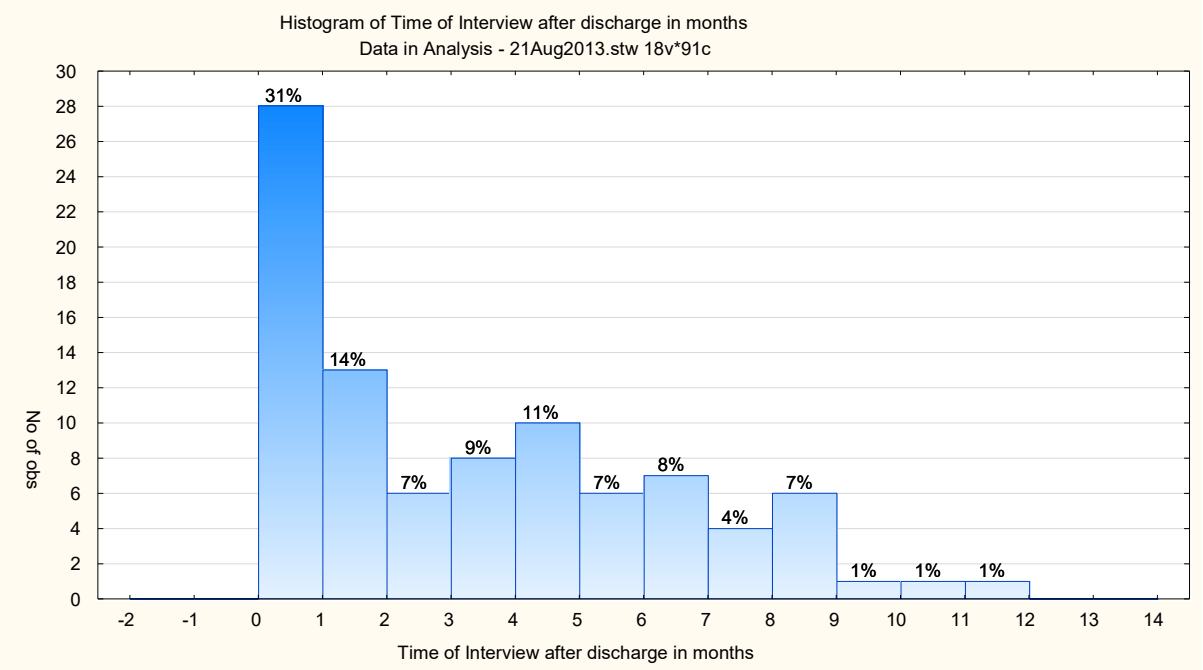
Other variables included ： cognitive behavior therapy (100%), group therapy (100%) and brief motivational interviewing (100%), referral to local social workers (100%), referral to local substance abuse support groups (100%), mean length of substance use was 5.7 years (95% CI: 4.6- 6.8,SD 4.0) . The minimum length of substance use was 1 year with a maximum of 25 years

(see table 3). Clear records about the attendance of patients at social workers offices and support groups were not available. Many patients used three substances combined e.g. methamphetamine, alcohol and cannabis hence the substance co-abuse percentages adds to a total greater than 100%. Many patients (n=31) did not have very good educational backgrounds with some completing matric and one having reached technikon level at the time of in-patient treatment. The mean time of interview after discharge was 3.8 months (95% CI: 3.2- 4.4, SD 3.0) (see table 3).. A total of 31% of patients were interviewed within the 1 month and 45% of patients within the first 2 months after discharge from treatment (see figure 1).

Table 3 Characteristics of sample population

Variable	*Valid N*	*Mean*	*Confidence - - 95%*	*Confidence - 95%*	*Median*	*Minimum*	*Maximum*	*Std.Dev.*
Age yrs	*91*	*24.62637*	*23.45704*	*25.79570*	*23.00000*	*18.00000*	*46.00000*	*5.614759*
Time of Interview after discharge in months	*91*	*3.80568*	*3.18107*	*4.43029*	*3.00000*	*0.10000*	*12.00000*	*2.999173*
Length of drug use yrs	*49*	*5.71429*	*4.57890*	*6.84968*	*5.00000*	*1.00000*	*25.00000*	*3.952847*

Figure 1



Characteristics of patients who self-reported abstention at time of aftercare interview

These patients were interviewed at a mean of 3.4 months (95% CI: 2.7- 4.1, median 2, SD 2.9) after discharge. Abstention was self –reported by 67 patients (73.6%). These were characterized as follows

(see table 4) : age 24.4 years (95% CI: 23.1- 25.7, SD 5.3) female (31.3%) male (68.7%), employed (20.9%) unemployed (77.6%) missing employment status (1.5%), voluntary (44.8%) rehab court (8.9%) criminal court (46.3%).

Table 4

Abstaining at time of Interview N=67

Category	***Count N=67***	***%***
Male	46	68.7
Female	21	31.3
Employed	52	20.9
Unemployed	14	77.6
Missing employment status	1	1.5
Voluntary	30	44.8
Rehab court	6	8.9
Criminal Court	31	46.3

Co-abused substance use occurred as follows (see table 5): cannabis (50.7%) alcohol (11.9%) mandrax (35.8%) heroin (4.5%) cocaine (4.5%) other (3%).

Table 5

Abstaining at time of Interview N=67

Co-Abused Substance	***Usage Yes/No***	***Count N=67***	***%***
Cannabis	No	32	47.8
	Yes	34	50.7
	Missing	1	1.5
Alcohol	No	49	73.13
	Yes	8	11.94
	Missing	10	14.93
Mandrax	No	42	62.7
	Yes	24	35.8
	Missing	1	1.5
Heroin	No	61	91.0
	Yes	3	4.5
	Missing	3	4.5
Cocaine	No	62	92.5
	Yes	3	4.5
	Missing	2	3.0
Other	No	63	94.0
	Yes	2	3.0
	Missing	2	3.0

Nine patients who self-reported abstention at the time of the interview also reported that they had previously relapsed at 1.3 months (N=9, 95% CI: 0.5- 2.2, SD 1.0) (see table 6). The relapse times were as follows: 33% within 2 weeks, 66% within 1 month, 77% (1.5-2 months) and 100% (2.5-3 months) after discharge from treatment. The mean length of substance use was 4.8 years (95% CI: 3.8- 5.9, SD 2.8) (see table 6).

Table 6 Abstainers who relapsed previously N=9

Variable	Valid N	Mean	Confidence - - 95%	Confidence - 95%	Median	Minimum	Maximum	Std.Dev.
Time of Interview after discharge in months	91	3.80568	3.18107	4.43029	3.00000	0.10000	12.00000	2.999173
If Abstaining at Time of Interview, time of previous relapse after discharge	9	1.33704	0.50328	2.17079	1.00000	0.03333	3.00000	1.084672

Characteristics of patients admitting to amphetamine use at time of aftercare interview

These patients were interviewed at a mean of 5.0 months (95% CI: 3.8- 6.2, median 5, SD 2.9) after discharge. Methamphetamine use was self-reported by 24 (26.4%) patients. These were characterized as follows (see table 7): age 25.2 years (95% CI: 22.5- 27.9, SD 6.4) female (29.2%) male (70.8%), employed (16.7%) unemployed (83.3%), voluntary (41.6%) rehab court (4.2%) criminal court (54.2%).

Table 7

Using Amphetamine at time of Interview N=24

Category	***Count***	***%***
Male	17	70.8
Female	7	29.2
Employed	4	16.7
Unemployed	20	83.3
Voluntary	10	41.7
Rehab court	1	4.2
Criminal Court	13	54.1

Co-abused substances occurred as follows (see table 8): cannabis (62.5%) alcohol (37.5%) mandrax (33.3%) heroin (0%) cocaine (4.2%) other (8.3%).

Table 8

Abstaining at time of Interview N=24

Co-Abused Substance	***Usage Yes/No***	***Count N=24***	***%***
Cannabis	No	9	37.5
	Yes	15	62.5
	Missing	0	0
Alcohol	No	12	50.0
	Yes	9	37.5
	Missing	3	12.5
Mandrax	No	16	66.7
	Yes	8	33.3
	Missing	0.0	0.0
Heroin	No	24	100
	Yes	0.0	0.0
	Missing	0.0	0.0
Cocaine	No	23	95.8
	Yes	1	4.2
	Missing	0.0	0.0
Other	No	22	91.7
	Yes	2	8.3
	Missing	0.0	0.0

The mean time of relapse for non-abstainers was 0.9 months (N=16, 95% CI: 0.4- 1.5, SD 1.2) (see table 9). The relapse times were as follows: 62% within 2 weeks, 76% within 1 month, 86% (1.5-2 months), 95% (2.5-3 months) and 100% (3.5-4 months) after discharge from treatment. The mean length of substance use was 7.5 years (95% CI: 4.7- 10.3, SD 5.3).

Table 9 Amphetamine users, Time of relapse

Variable	Valid N	Mean	Confidence - - 95%	Confidence - 95%	Median	Minimum	Maximum	Std.Dev.
Age yrs	91	24.62637	23.45704	25.79570	23.00000	18.00000	46.00000	5.614759
If Not Abstaining at Time of Interview, months at which relapse occurred after discharge	21	0.93651	0.40548	1.46754	0.25000	0.03333	4.00000	1.166603

Statistical analyses

Pearson Chi-square tests to examine for associations between different variables and abstention produced the following results as shown in Table 10:

Table 10: Associations between different variables and abstentions

	Association present? yes(Y) no (N)	P-value
gender and abstention	N	0.842
employment and abstention	N	0.63
type of referral i.e. voluntary vs. criminal court vs. rehab court and abstention	N	0.67
alcohol and abstention	Y Patients who abstained from alcohol also abstained from methamphetamine use	0.006
co-using cannabis and abstention	N	0.35
co-using mandrax and abstention	N	0.79
co-using heroin and abstention	N	0.28
co-using cocaine and abstention	N	0.927
co-using any other drugs and abstention	N	0.288

A Mann-Whitney U test and Box-Plot to compare non parametric data which did not follow normal distribution produced the following results:

I. there was no association between age and abstention

II. there was no association between educational grade and abstention

III. there was an association between time of interview after discharge and abstention (z=-0.244, p=0.0145).

   a. Patients who abstained were interviewed early at a median of 2 months while those who relapsed were interviewed at a median of 5 months.

IV. there was an association between length of substance use and abstention (z=-2.25, p=0.0243)

   a. Patients who abstained had used methamphetamine for shorter at 4.8 years while those who relapsed had used methamphetamine for longer at 7.5 years.

DISCUSSION

With a global illicit drug market in excess of U$320b coupled with a rising tide of methamphetamine abuse in South Africa and a lagging National Master Plan against illicit drug smuggling and abuse, effective rehabilitation programmes play an essential role in the fight against amphetamine abuse [11,49,50,51]. The successful implementation of South Africa's National Master Plan against illicit drugs has been hampered amongst other by frequent reports of police corruption and senior government officials being convicted of drug trafficking [49]. Maintaining rehabilitation programmes can be costly and it is therefore pertinent that the performance of these programmes be assessed regularly.

This study has shown that the patients did not receive adequate aftercare after discharge from in-patient treatment. Final aftercare reporting was terminated too early i.e. at a mean of 3.8 months after discharge. This research therefore concludes that the performance of rehabilitation at De Novo treatment centre cannot be accurately assessed beyond 2 months for abstainers and 5 months for non-abstainers. International literature reviews recommend that assessments be done from 6 months onwards after discharge in order to get a more accurate assessment of the success of rehabilitation. This is so because the physiological effects of methamphetamine abuse persists for one to two years. Too early an assessment may give a false impression of the success of rehabilitation. The patients who self-reported abstention (73.6%) were assessed at a median time of 2 months. Thus, at a median of 2 months the De Novo treatment programme appeared to have performed well by having almost three quarters of its clients in abstention from methamphetamine use. However, the longer it took to assess the patients after discharge the more likely they were found to have relapsed. This was shown when patients who were assessed later -at a median of 5 months after discharge -were found to have relapsed. Statistical analysis (ANOVA Mann Whitney U test) found this effect of “time of interview after discharge” unlikely to have occurred by chance.

The mean age of amphetamine users of 24.6 as well as the male (69.2%) and female (30.8%) proportions is consistent with other studies done in South Africa [9].Co-using alcohol and prolonged use of methamphetamine had an effect on the outcome of rehabilitation. Avoidance of alcohol was found to be good for rehabilitation from methamphetamine abuse. Alcohol was found to be the only co-abused substance which - when not used together

with methamphetamine- was associated with a greater chance of abstaining. Co-abusing alcohol with amphetamines has been associated with increased risky sexual behavior and eventual development of psychiatric illness [52]. Using methamphetamine for a prolonged period i.e. ≥ 7.5 years is associated with increased risk of relapse after discharge from rehabilitation. This group of patients might need special attention after discharge from in-patient treatment e.g. regular and longer aftercare follow-up.

There is an apparent contradiction when the outcome for the group who abstained is compared with the group who relapsed. Since the interviews were done early and most patients –who relapsed in the abstaining group- relapsed early, the relapsed group was expected to be larger. Instead the relapsed group was much smaller than the abstaining group. The explanation for this apparent contradiction lies in the relatively small number of cases (n=9) who initially relapsed and then later abstained. Also, the statistical analysis showed that the two groups (abstainers vs. those who relapsed) differed significantly i.e. it cannot be claimed with 100% certainty that all patients who relapsed would have ended up in the group of abstainers if they were interviewed earlier.

The outcome of rehabilitation was not affected by patient age, gender, employment status, educational level, type of referral and co-using any other substances except alcohol. This finding was a surprise because it would be expected that being in employment gives patients stability and security and hence better motivation to abstain from amphetamine use. Level of education also did not affect treatment outcome. Similarly one would expect that a better education assists with greater insight, indirectly stability and security and hence better motivation to abstain from amphetamine use. Of note in this population is the generally poor level of education and high unemployment rate of all patients in the sample. Also a significant number of data about level of education was missing from folders. A potential confounding variable would have been patients referred by the criminal court. The patients referred by the criminal court had the same treatment outcome as voluntary patients. This corresponds with findings in other studies internationally [21]. Even if the patients referred by the criminal court had relapsed after discharge, there has been no clear evidence that these patients were routinely threatened with court action.

The urine amphetamine test is the gold standard test to confirm abstinence. This test is not without limitations and not practical to use routinely during patient follow up. The next best test - and also much more practical to use -to confirm abstinence is the psychometric test. However, the test needs to be done with respect for certain internationally recommended standards. Even though there exists no agreement internationally as to which psychometric test is the most sensitive and specific to use, at least the tests mentioned in this paper have been subjected to international study on numerous occasions [21,22,37,44,45]. The importance of having uniformity with psychometric tests must be emphasized because without uniformity it is difficult to compare rehabilitation outcomes nationally let alone internationally. De Novo has been using neither the amphetamine urine test nor one of the 6 psychometric tools mentioned above. The only instrument available was a standardised

questionnaire –which includes patient self- reporting of abstinence- used by counselors at De Novo during follow up visits after discharge from in-patient treatment.

Doing a study at De Novo has proven to be a big challenge for the following two reasons:

1) There is no international uniformity about the measuring tools to use to assess substance abuse [37,38]

2) A section of the political system in South Africa i.e. The Promotion of Access to Information Act (PAIA) has made it virtually impossible to access patient folders at Rehabilitation centres like De Novo to conduct research [39]

Given the health and socio-economic consequences of substance abuse coupled with the cost of maintaining rehabilitation programmes, the importance of dealing with this challenge in practice cannot be overstated.

RECOMMENDATIONS

1. Any national or regional plan aimed at dealing with the illegal distribution of illicit drugs must take cognizance of the current political and economic issues affecting the outcome of such plans. By this is meant that there are factors beyond the control of the Department of Social Development which may reduce the impact of its plans e.g. inadequate land and marine border control, different provincial political parties may implement the plan differently and national/provincial budget allocations may be inadequate for the successful implementation of plans.
2. An adequate supply of aftercare workers must be made available.
3. International standards must be used as reference when drafting aftercare report templates e.g. ASI and CAUD.
4. The Minister of Social Development must be informed of the continued need for resources for aftercare support.
5. The minimum skills required by aftercare workers to do aftercare reporting and “care staff” must be clearly defined.
6. Aftercare must be done for a minimum of 6 months after discharge.

7. Aftercare report dates must by necessity be synchronized with institutional performance audits so that data collected from aftercare reports are useful for the auditing programme. Data is not useful when an aftercare report is done less than 6 months after discharge while the performance audits look at longer intervals of 6 and 12 months.
8. Ways must be found to make aftercare a less laborious process, e.g. an electronic reporting template via cell phone and e-mail instead of faxing and physically transporting handwritten reports around.
9. Clients who co-abuse alcohol with amphetamine have a high risk of relapse. They must be given additional support over and above what is normally offered.
10. Cognitive behavior therapy and brief motivational interviewing – which is currently used by De Novo- have been the two most effective psychotherapeutic approaches internationally. These should not be abandoned
11. A qualitative study is needed to assess reasons for the poor treatment outcome.

STUDY LIMITATIONS

1. All 91 cases had confirmed methamphetamine use documented in the folders. Reliability and validity of data was influenced by the fact that only partial copies of patient folders were made available. Hence information of some variables was not available or copied e.g. length of substance use prior to treatment and educational grade. No toxicology tests were performed in any of the cases. Only a psychometric instrument was used to assess the patients' substance abuse. The aftercare questionnaire –psychometric instrument- does not have a reference or clear relation to any of the psychometric instruments used internationally e.g. ASI [43]. Validity of patient self–report was dependent on the interviewing skills of the aftercare reporters.
2. Early cessation of aftercare reporting i.e. before 6 months after discharge set a limit on the amount of information available about treatment outcome. Treatment outcome beyond 6 months after discharge is not available
3. Aftercare reports did not explicitly state the venue and whether patient privacy and confidentiality was guaranteed at interviews. The report needs to include information about the privacy and confidentially offered to the patient during the interview as well as the venue of the interview, etc. Patients who are concerned about the privacy and confidentially of their information may not be willing to fully disclose their substance abuse to the interviewer
4. Some information was missing from folders e.g. educational qualifications and venue of the interview. This data could not be fully analysed.

CONCLUSION:

Amphetamine abuse occur word wide. In South Africa, the Western Cape (1108%) and Eastern Cape (657%) has reported the highest increase in amphetamine use [8,9]. Amphetamine treatment outcome studies in South Africa and internationally are sparse. This study found that the provision of adequate rehabilitation from amphetamine abuse is a major challenge. Patients relapsed as early as two months after discharge from in-patient treatment. The co-abuse of alcohol and amphetamine as well as prolonged use of amphetamine for ≥7.5 years impacted negatively on the successful outcome of rehabilitation. This latter group of patients may require special attention during in-patient treatment and aftercare. The substance abuse programme at De Novo may benefit from the input of lessons learned from similar programmes elsewhere in South Africa and internationally. In particular, patients need to be followed up for at least 6 months after discharge from treatment. The median two month period of aftercare follow up of patients at De Novo was inadequate**.**

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